

REMARKS***Summary of the Response***

By the present response, claims 12 and 22 have been amended for the Examiner's consideration. Applicant submits that no new matter is added by the present amendment. Support for the amendment may be found, for example, at least in Figures 1A – 2D. Accordingly, upon entry of the amendment, claims 12 – 36 will be pending. Reconsideration of the rejected claims in view of the above amendment and following remarks is respectfully requested.

Summary of the Office Action

In the instant Office Action, the Examiner has rejected claims 12 – 36 over the art of record. By the present amendment and remarks, Applicant submits that the rejections have been overcome, and respectfully requests reconsideration of the outstanding Office Action and allowance of the present application.

Traversal of Drawing Objections

Applicants traverse the objection to the drawings for purportedly failing to show all the features specified in the claims. Specifically, the Examiner asserts that the “swirler space comprising a *tapering area*,” as recited in claim 14, is not shown in the drawings.

Applicants disagree. Applicants submit the Figures clearly show a tapering area with a decrease in cross-sectional area, for example, at least in Figures 1A and 1B. Accordingly, Applicant requests the Examiner withdraw the objection to the drawings for purportedly failing to show all the features specified in the claims.

Additionally, Applicant traverses the objection to the drawings for including solid black shading and lines, numbers and letters of inconsistent line thickness and/or quality. Initially, Applicant respectfully submits that none of the Figures include solid black shading. Additionally, Applicants respectfully submit that Figures 1A and 1B do not include lines, numbers and letters of inconsistent line thickness and/or quality. Accordingly, Applicant has included three (3) sheets of amended Figures with lines, numbers and letters of consistent line thickness and quality corresponding to Figures 2 - 6. Applicant notes that no amendments were made to Figures 1A and 1B.

Accordingly, Applicant requests the Examiner withdraw the objection to the drawings for purportedly including solid black shading and lines, numbers and letters of inconsistent line thickness and/or quality.

Traversal of Rejection Under 35 U.S.C. § 102(b)

To anticipate a claim, each and every element as set forth in the claim must be found, either expressly or inherently described, in a single prior art reference. MPEP § 2131. Applicant submits that none of the applied documents discloses each of the features recited in at least the independent claims.

1. Over GRADON

Applicant traverses the rejection of claims 12 – 16, 19, 21, 22, 25, 27 - 30 and 32 - 35 under 35 U.S.C. § 102(b) as being anticipated by GRADON. The rejection is respectfully traversed.

In addressing previously presented claims 12 and 22, the Examiner asserted U.S. Patent No. 3,498,059 to Gradon et al. [hereinafter "GRADON"] and/or U.S. Patent No. 6,893,255 to Grob et al. [hereinafter "GROB"] disclosed each of the features of these previously presented claims. While Applicant does not agree with the Examiner that the applied art under 35 U.S.C. §102(b) anticipates the embodiments of the invention recited in at least claims 12 and 22, in an effort to advance prosecution, claims 12 and 22 have been amended to even more clearly define the features of the present invention. Further, Applicant expressly reserves the right to refile the subject of independent claim 12 and 22 as presented prior to this amendment in one or more continuing applications.

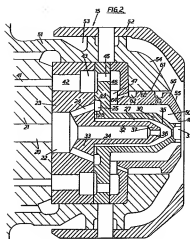
Independent Claims 12 and 22

Embodiments of the present invention are directed to an injection element. Claims 12 and 22 recite, in pertinent part:

. . . wherein the injection element is a rocket drive injection
element, and
wherein the bores open to the combustion space.

Applicant respectfully submits GRADON does not disclose that the Examiner-designated bores open to the combustion space, as recited in claims 12 and 22.

GRADON discloses a burner, for example, for a gas turbine engine combustion chamber. In addressing claim 12, the Examiner designates drillings 64 as the recited bore. In addressing claim 22, the Examiner designates passages 45 as the recited bore. Applicant has reproduced Figure 2 of GRADON below, which illustrates the burner 15, which includes the above-noted elements of GRADON.



Applicant respectfully submits GRADON does not disclose that the Examiner-designated bores (i.e., drillings 64 or passages 45) open to the combustion space. Instead, as shown in the above Figure, each of the Examiner-designated bores (i.e., drillings 64 or passages 45) are located well inside the structure, such that these passages do not “open to the combustion space,” as recited in claims 12 and 22. That is, the drilling 64 is structured and arranged to supply fuel to reservoir 62, and thus opens to the reservoir 62. Additionally, the passage 45 is structured and arranged to communicate with a feed annulus 46, and thus opens to the feed annulus 46.

Therefore, Applicant respectfully submits GRADON does not disclose that the bores open to the combustion space, as recited in claims 12 and 22.

Independent Claim 28

Independent claim 28 recites, in pertinent part:

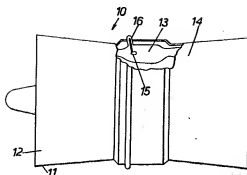
... guiding fuel into the combustion chamber through a first outlet opening;
 guiding fuel into the combustion chamber through a second outlet opening arranged coaxially with the first outlet opening; and
 forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening.

Applicant submits that GRADON does not disclose each of the features of the present invention. For example, Applicant submits that GRADON does not disclose forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening, as recited in claim 28.

No Disclosure of Forming A Cooling Liquid Film Layer In The Combustion Chamber Through Bores

Applicant submits GRADON does not disclose forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening. In addressing this feature of claim 28, the Examiner cites column 3, lines 45 – 54 of GRADON. Applicant disagrees.

Initially, while the Examiner asserts that the surface 55 is reasonably construed as a surface of a combustion chamber, Applicant respectfully disagrees. Applicant submits that surface 55 is a surface of the burner. Applicant notes GRADON explicitly designates element 13, as shown in Figure 1 (reproduced below) as the combustion chamber of GRADON. Figure 1 also illustrates the burner 15 (which is the illustration of Figure 2, reproduced above) and its relative arrangement to the combustion chamber 13 of GRADON.

FIG. 1

While acknowledging that the burner 15 is situated within the combustion chamber 13, Applicant respectfully submits that one of ordinary skill in the art would not consider surface 55 to be part of the combustion chamber 13.

In view of the above, Applicant respectfully submits the Examiner is not free to designate surface 55, which is an element of the burner 15, as a wall of the combustion chamber 13. That is, such a designation is completely in conflict with the explicit teachings of GRADON, which designates element 13 as the combustion chamber.

Additionally, assuming *arguendo* that the Examiner can reasonably consider surface 55 to be part of the combustion chamber (which Applicant does not concede), Applicant submits GRADON does not disclose forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening.

Applicant submits GRADON uses a film of fuel that passes over surface 55 *so as to assist in preventing the formation of carbon deposits on the surface 55*. Furthermore, Applicant submits that the above passage (and GRADON in its entirety) is silent with regard to the recited “forming a cooling liquid film layer in the combustion chamber.” That is, Applicant respectfully submits that GRADON does not disclose a method comprising forming a cooling liquid film

layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening.

Accordingly, for at least these reasons, Applicant respectfully submits that GRADON does not disclose each of the features of claim 28, and does not anticipate the present invention.

Dependent Claims 13 – 16, 19, 21, 25, 27, 29, 30 and 32 - 35

Applicant respectfully submits that claims 13 – 16, 19, 21, 25, 27, 29, 30 and 32 - 35 depend from respective allowable independent claims, and are allowable based upon the allowability of the independent claims, and because these claims recite additional subject matter to further define the instant invention.

Accordingly, for at least these reasons, Applicant respectfully requests the Examiner withdraw the rejection of claims 12 – 16, 19, 21, 22, 25, 27 - 30 and 32 - 35 and indicate claims 12 – 16, 19, 21, 22, 25, 27 - 30 and 32 - 35 are allowable.

2. Over GROB

Applicant traverses the rejection of claims 12, 22, 35 and 36 under 35 U.S.C. § 102(b) as being anticipated by GROB. The rejection is respectfully traversed.

Independent Claims 12 and 22

Embodiments of the present invention are directed to an injection element. Claims 12 and 22 recite, in pertinent part:

. . . wherein the injection element is a rocket drive injection
element, and
wherein the bores open to the combustion space.

Applicant respectfully submits GROB fails to disclose the injection element is a rocket drive injection element, as recited in claims 12 and 22.

GROB is directed to a spray burner for the thermal decomposition of sulfur-containing residues. Applicants submit, however, that GROB fails to disclose a rocket drive injection element, as recited in claims 12 and 22. That is, Applicants submit that GROB is not directed to (nor suitable for) a rocket drive injection element. As such, Applicants submit that GROB fails to disclose each of the feature of the presently claimed invention, and fails to anticipate the presently claimed invention.

Dependent Claims 35 and 36

Applicant respectfully submits that claims 35 and 36 depend from respective allowable independent claims, and are at least allowable based upon the allowability of the independent claims, and further because these claims recite additional subject matter to further define the instant invention.

Accordingly, for at least these reasons, Applicant respectfully requests the Examiner withdraw the rejection of claims 12, 22, 35 and 36, and indicate claims 12, 22, 35 and 36 are allowable.

3. Over STURGESS

4. Over STURGESS '413

Applicant traverses the rejection of claims 28 – 31 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,866,413 to Sturgess [hereinafter STURGESS '413]. The rejection is respectfully traversed.

Independent Claim 28

Applicant submits that STURGESS '413 does not disclose each of the features of the present invention. For example, Applicant submits that STURGESS '413 does not disclose forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening. Additionally, Applicant submits the Examiner has not addressed each of the features of claim 28.

All Claim Features Not Addressed

Independent claim 28 recites, in pertinent part:

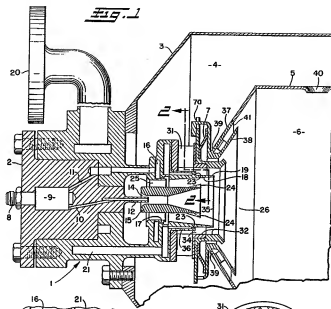
... forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening.

In addressing claim 28, the Examiner states "[t]he bores [17] inject fuel onto a prefilming surface 18 (i.e. they create a film layer)." However, Applicant submits the Examiner again has failed to address each of the features of claim 28. That is, the Examiner never addressed forming a cooling liquid film layer in the combustion chamber. As such, Applicant submits the Examiner has issued an incomplete office action and an unclear record, as discussed further below.

No Disclosure of Forming a Cooling Liquid Film Layer in Combustion Chamber

Additionally, Applicant submits STURGESS '413 does not disclose forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening. In addressing claim 28, the Examiner designates the prefilming surface 18 as the recited combustion chamber. However, Applicant notes STURGESS '413 specifically designates element 6 as the combustion chamber of the STURGESS '413 device. Applicant has

reproduced Figure 1 of STURGESS '413, which illustrates the Examiner-designated combustion chamber (i.e., prefilming surface 18) and actual combustion chamber 6.



As shown in Figure 1, the Examiner-designated combustion chamber (i.e., prefilming surface 18) is located upstream of the actual combustion chamber 6. Moreover, Applicant submits the Examiner is not free to designate prefilming surface 18 as a combustion chamber when STURGESS '413 explicitly designates another element as the combustion chamber. As such, Applicant submits the prefilming surface 18 cannot reasonably constitute the recited combustion chamber.

Thus, for at least these reasons, Applicant submits STURGESS '413 does not disclose the features of claim 28, and does not anticipate the present invention.

Dependent Claims 29 and 31

Applicant respectfully submits that claims 29 and 31 depend from an allowable independent claim, and are allowable based upon the allowability of the independent claim, and because these claims recite additional subject matter to further define the instant invention.

Claim 29

Claim 29 recites, in pertinent part:

... wherein the cooling liquid film layer is directed at least in part towards a combustion space inner wall.

In addressing claim 29, the Examiner states “[t]he surface 18 is considered a combustion space inner wall.” For the reasons discussed above with regard to claim 28, Applicant respectfully submits that the Examiner’s assertion that the surface 18 is considered a combustion space inner wall is unsupportable. That is, Applicant submits STURGESS ‘413 specifically designates element 6 as the combustion chamber of the STURGESS ‘413 device. Thus, Applicant submits the Examiner is not free to designate prefilming surface 18 as a combustion chamber surface when STURGESS ‘413 explicitly designates another element as the combustion chamber.

Thus, for at least these reasons, Applicant submits STURGESS ‘413 does not disclose the features of claim 29, and does not anticipate the present invention.

Accordingly, for at least these reasons, Applicant respectfully requests the Examiner withdraw the rejection of claims 28, 29 and 31 and indicate claims 28, 29 and 31 are allowable.

Traversal of Rejection Under 35 U.S.C. § 103(a)

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. See MPEP §2142. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.¹ Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Applicants submit that the combination of references do not teach or suggest each of the features of the present invention.

1. Over GRADON in view of STURGESS

Applicant traverses the rejection of claims 17, 18, 23 and 24 under 35 U.S.C. § 103(a) as being unpatentable over GRADON in view of STURGESS. The rejection is respectfully traversed.

As neither applied document discloses or suggests the above-noted subject matter recited in at least Applicant's independent claims 12 and 22, as discussed above, Applicant submits that

¹ While the *KSR* court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the [Supreme] Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356-1357 (Fed. Cir. 2007) (quoting *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007)).

no proper combination of GRADON in view of STURGESS can even arguably render unpatentable the embodiments of the invention recited in the pending claims. Therefore, Applicant submits that pending rejection is improper and should be reconsidered and withdrawn.

Additionally, Applicant submits claims 17, 18, 23 and 24 depend from respective allowable independent claims, and are allowable based upon the allowability of the independent claims, and because these claims recite additional subject matter to further define the instant invention.

Accordingly, for at least these reasons, Applicant respectfully requests the Examiner withdraw the rejection of claims 17, 18, 23 and 24 and indicate claims 17, 18, 23 and 24 are allowable.

2. Over GRADON in view of SHEKLETON

Applicant traverses the rejection of claims 20 and 26 under 35 U.S.C. § 103(a) as being unpatentable over GRADON in view of U.S. Patent No. 5,113,647 issued to Shekelton [hereinafter "SHEKLETON"]. The rejection is respectfully traversed.

Applicant respectfully submits that claims 20 and 26 depend from respective allowable independent claims, and are allowable based upon the allowability of the respective independent claims, and because these claims recite additional subject matter to further define the instant invention. Moreover, Applicant submits SHEKLETON does not cure the deficiencies note above with regard to GRADON. Applicant notes the Examiner only cited SHEKLETON for its purported teachings of the features of claims 20 and 26.

Accordingly, for at least these reasons, Applicant respectfully requests the Examiner withdraw the rejection of claims 20 and 26 and indicate claims 20 and 26 are allowable.

Authorization to Charge Deposit Account

The undersigned authorizes the charging of any necessary fees, including any extensions of time fees required to place the application in condition for allowance by Examiner's Amendment, to Deposit Account No. 19 - 0089 in order to maintain pendency of this application.

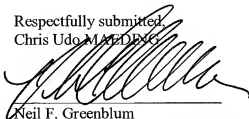
CONCLUSION

In view of the foregoing, it is submitted that none of the references of record, either taken alone or in any proper combination thereof, anticipate or render obvious the Applicant's invention, as recited in claims 12 - 36. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all of the claims therein are respectfully requested and now believed to be appropriate.

Should there be any questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
Chris Udo MATHIAS



Neil F. Greenblum
Reg. No. 28,394

Robert W. Mueller
Reg. No. 35,043

GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191

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